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54 Trip mechanism with a controlled burst fire device for firearms.

57 The trip mechanism makes it possible, by means of an appropriate fire selector, to fire either a single shot or controlled bursts comprising three or more shots every time the trigger of the firearm is pulled.

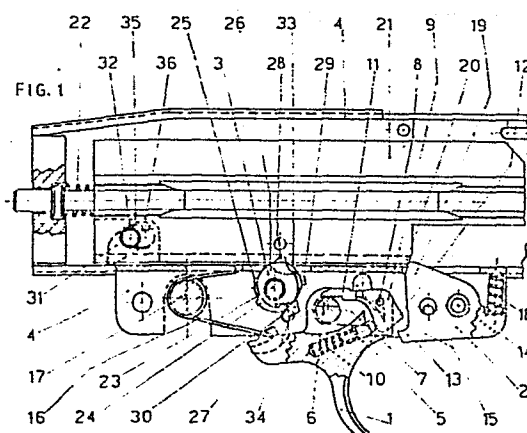
It can be fitted to any firearm.

The mechanism comprises a ratchet wheel (3) pivoted on the receiver (4) of the firearm and having a plurality of trip teeth (24), (25), (26) corresponding to the number of shots to be fired with a burst, adapted to engage a trip tooth (27) carried by the trigger (1).

The ratchet wheel (3) is also provided with a corresponding number of lugs (28), (29), (30) adapted to engage a tongue (31) pivoted on the bolt (2) by means of a pin (32).

A bolt stopping element (2) pivoted on the receiver (4) of the arm has a first trip tooth (19) adapted to co-operate with a catch (20) on the bolt (21) and a second trip tooth (13) disposed at an end of an arm (9) pivoted on the trigger (1) and biased by a spring (10) with its other end against the pin (5) of the trigger (1).

This pin has a flat section (6) and is connected to a control member (7) exterior to the arm by means of which the pin (5) can be brought from a position in which it abuts the arm (9) by means of its cylindrical surface to a position in which it abuts the arm (9) by means of its flat section (6).



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Trip mechanism with a controlled burst fire device
for firearms

The present invention relates to trip mechanisms with a controlled burst fire device for firearms.

Presently used trip mechanisms with a controlled
5 burst fire device are very limited in number and a few firearms have this particular fire system.

In most cases these trip mechanisms consist of complex lever systems which are difficult to assemble and set up, require particular cleaning and servicing operations for a correct operation of
10 the firearm and make the firearm very complex and expensive.

15 It is the object of the present invention to obviate all these difficulties and provide a simple controlled burst fire device which consists of very few elements, operates in a fully original manner, has no difficulties concerning assembly and set up, does
20 not require frequent servicing, is little cumbersome and is easily fitted to any type of arm.

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More particularly the trip mechanism with a controlled burst fire device according to the invention is characterized in that it comprises a ratchet wheel pivoted to the receiver of the firearm and biased
5 by a spring to a rest position against a limit stop, said ratchet wheel having a plurality of trip teeth corresponding to the number of shots to be fired by a single burst, adapted to engage a trip tooth carried by the trigger, and a plurality of lugs, equal
10 in number to the trip teeth, adapted to engage an arm pivoted to the bolt and biased by a spring towards a stop carried by the bolt; a bolt stopping element pivoted on the receiver of the firearm, biased by a spring and having a first trip tooth adapted to cooperate
15 with a catch disposed on the bolt and a second trip tooth; and a rocking arm pivoted on the trigger, constantly biased by a spring with one end thereof towards the pin on which the trigger is pivoted and having at the other end thereof a trip tooth adapted
20 to cooperate with the second trip tooth of the bolt stopping element.

The ratchet wheel carries out a predetermined rotation under the action of the bolt at each shot fired
25 and the position it takes every time is assured only by the trigger resting on it under the exclusive action of the finger pressure actuating it.

At the same time, when the ratchet wheel changes its
30 position under the action of the bolt of the arm, its movement is so rapid that the shooter does not feel it

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at all on the finger actuating the trigger.

Once the bolt stopping element has been released, the burst is discontinued and, in order to continue to
5 fire, it is required that the shooter releases the trigger and depresses it again.

During this movement and before the trigger is depressed again, the ratchet wheel released from the contact of the trigger, returns in its rest position
10 under the action of the spring which causes it to rotate in a direction opposite that imparted it by the bolt and is ready immediately to repeat the working cycle.

15 It is finally possible, by means of an appropriate fire selector, to fire by means of the same trip mechanism also single shots by changing the intersection surface between the trigger and the bolt
20 stopping element.

Under this condition, in fact, every time the trigger is pulled, a shot goes off and releases the catch of the bolt before the trigger abuts the ratchet
25 wheel.

It is therefore apparent that in order to fire another shot, it is necessary to release and pull again the trigger thus creating the condition for semiautomatic
30 fire.

The invention will be better understood from the following detailed description, given merely as an example and therefore in no limiting sense, of an embodiment thereof as applied to a firearm with blow back
5 locking, firing with the bolt in unlocked position, of which all parts are omitted which operate in a manner similar to that of the firearms presently in use.

In the corresponding drawings:

10 Fig. 1 shows the trip mechanism in rest position, ready for firing, in the semiautomatic operation condition of the arm;

Fig. 2 shows the trip mechanism in the semiautomatic
15 operation condition of the firearm with the trigger which has just fired a shot having rotated on its pivot under the action of the finger pressure actuating it; the bolt stopping element is already disengaged from the trigger which is at the end of its stroke in
20 abutment with the ratchet wheel;

Fig. 3 shows the trip mechanism in the rest position, ready for firing, in the controlled burst operation condition of the firearm; and

25

Fig. 4 shows the trip mechanism in the controlled burst operation condition of the firearm with the trigger which, depressed by the finger actuating it, is in abutment with the ratchet wheel, and the bolt which
30 has already fired a shot and is returning to its unlocked position and the bolt stopping element which,

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being still engaged with the trigger, leaves the bolt free to burst fire.

The trip mechanism according to the invention consists essentially (Fig. 1) of a trigger 1, a bolt stopping element 2 and a ratchet wheel 3.

The trigger 1 is pivoted to the receiver 4 of the arm by means of the pin 5 having a flat face 6 and can be operated from outside the arm by means of its extension 7.

Pivoted on the trigger 1 by means of the pin 8 is an arm 9 which biased by the spring 10, is maintained by means of its tongue 11 always in abutment with the pivot 5 of the trigger 1.

The firearm 9 has a trip tooth 12 adapted to engage a similar trip tooth 13 of the bolt stopping element 2 pivoted to the receiver 4 of the firearm by means of the pin 14.

The arm 9 is in addition provided with a protuberance 15 which, by coming in abutment with the receiver 4 of the firearm, determines the front rest or stop position of the trigger 1 biased by the spring 16 secured to the pin 17.

The bolt stopping element 2 has a spring 18 biasing it always upwards with its trip tooth 19 engaged with a similar catch 20 of the bolt 21 biased by the spring

22.

The ratchet wheel 3 pivoted on the receiver 4 of the firearm by means of the pin 23 has three trip teeth
5 24, 25, 26 adapted to engage a similar trip tooth 27 of the trigger and three lugs 28, 29, 30 adapted to engage an arm 31 pivoted on the bolt 21 by means of the pin 32.

- 10 The ratchet wheel 3 is provided with a torsion spring 35 which biases it always in abutment with the stop pin 36.

In the position of Fig. 1 the firearm is ready for
15 single shot firing; the bolt 21 is hooked by means of its catch 20 on the associated trip tooth 19 of the bolt stopping element 2, the trigger 1 is in rest position rotated forwardly on its pivot 5 in the stop position determined by the protuberance 15 of
20 the arm 9 on the receiver 4 of the firearm, the ratchet wheel is free in rest position determined by the abutment of the lug 30 against the pin 34 and the tongue 11 of the arm 9 is in abutment with the outer diameter of the pivot 5 of the trigger 1.

25

When the trigger 1 is depressed (Fig. 2), it rotates in clockwise direction on its pivot 5 and the trip tooth 12 of the arm 9 abuts the trip tooth 13 of the bolt stopping element 2 and lowers it until the trip
30 tooth disengages from the associated catch 20 of the bolt 21 which under the bias of the spring 22 goes

from the unlocked position of Fig. 1 to the locking position of Fig. 2 and strikes the cartridge in the barrel.

5 During the rotation of the trigger 1, before it reaches the rear stop position determined by the abutment of the trip tooth 27 against the ratchet wheel 3 (Fig. 2), the arm 9 disengages by means of its trip tooth 12 from the associated trip tooth 13 of the bolt stopping
10 element 2 which, not being pressed downwards any longer, is free, when the bolt returns to the unlocking position shown in Fig. 1, under the action of the spring 18, to stop the bolt 21 in unlocking position and engages again its trip tooth 19 with the associated
15 catch 20 of the bolt 21 thus preventing the burst going off of the second shot which will occur only if the trigger 1 is released and pressed again.

During the single shot fire the ratchet wheel 3 does
20 not take part at all in the operation of the trip mechanism but limits itself to carry out a rocking only when, the trigger 1 having been depressed, the bolt 21 returns from the position of Fig. 2 to the position of Fig. 1.

25

In this movement in fact the tongue 31 pivoted to the bolt 21 by means of the pin 32 strikes against the lug 28 of the ratchet wheel 3 and causes it to rotate until the trip tooth 27 of the trigger 1 hooks the
30 trip tooth 24 of the ratchet wheel 3.

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Immediately after, while the shooter releases and depresses again the trigger 1 to fire another shot, the ratchet wheel 3 returns, under the action of the torsion spring 33, in the rest position determined by the abutment of the lug 30 against the pin 34 before the trigger 1 is fully depressed again.

If it is instead desired to use the firearm for controlled burst firing, it is necessary to prearrange the firearm for this type of use.

To this end (Fig. 3) it is sufficient to rotate by 180° the fire selector of the firearm consisting of the extension 7 of the pin 5 on which the trigger 1 is pivoted.

In this manner in fact the tongue 11 of the arm 9 abuts the flat face 6 provided on the pin 5 and determines a longer extension of the trip tooth 12 of the arm 9 from the trigger 1.

It is apparent at this time that the firearm in the position of Fig. 3 is ready for controlled burst fire which, in the described case, is a three shots fire inasmuch as three are the lugs and the trip teeth of the ratchet wheel 3.

By pulling the trigger 1, in fact, similarly to what happened for the single shot fire, the trigger (Fig. 4) rotates in clockwise direction on its pivot 5 and the trip tooth 12 of the arm 9 abuts the trip tooth 3 of

the bolt stopping element 2 and lowers it until the trip tooth 19 disengages from the associated catch 20 of the bolt 21 which, pushed by the spring 22, goes from the position of Fig. 3 to the position of Fig. 4 and strikes the cartridge in the barrel.

At the same time when, in the first step, the trigger 1 reaches the rear stop position determined (Fig. 4) by the abutment of the trip tooth 27 against the ratchet wheel 3, the arm 9 does not succeed in disengaging by means of its trip tooth 12 from the associated trip tooth 13 of the bolt stopping element 2 which remains therefore still lowered in the position shown in Fig. 4.

At this time when the bolt 21, after the first shot has been fired, returns from the locking position towards the unlocking position, pushed by the pressure of the gases given off by the combustion of the powder charge, the tongue 31 pivoted on it by means of the pin 32, strikes against the lug 28 of the ratchet wheel and causes it to rotate until the trip tooth 27 of the trigger 1 which is being continuously depressed by the finger of the shooter, hooks the trip tooth 24 of the ratchet wheel 3 which condition is shown in Fig. 4.

Thereafter the bolt 21 which has reached the unlocking position, the bolt stopping device 2 being still lowered as seen above, will return again in locking position and fire automatically the second shot.

While the bolt 21 is returning again in unlocking

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position, the tongue 31 pivoted to it by means of the pin 32, strikes against the lug 29 of the ratchet wheel 3 and causes it to rotate until the trip tooth 25 of the ratchet wheel 3 hooks the trip tooth 27 of the trigger 1 in place of the trip tooth 24 of the same ratchet wheel.

When it has reached again the unlocking position the bolt 21, the bolt stopping element 2 being still held lowered by the trigger 1 as stated above, will return again in locking position, biased by the spring 22, and will fire automatically the third shot.

While the bolt 21 returns again in unlocking position, the tongue 31 pivoted on it by means of the pin 32 strikes the lug 30 of the ratchet wheel 3 and causes it to rotate until the trip tooth 26 of the ratchet wheel 3 hooks the trip tooth 27 of the trigger 1 in place of the trip tooth 25 of the same ratchet wheel.

20

At this time, while the bolt 21 still continues its unlocking movement, the trigger 1, always depressed by the finger of the shooter, rotates again on its pivot inasmuch as its trip tooth 27 is free to move beyond the trip tooth 26 of the ratchet wheel 3.

This further rotation causes the arm 9, like in the single shot fire (Fig. 2), to disengage its trip tooth 12 from the associated trip tooth 13 of the bolt stopping element 2 which, being no longer depressed downwards, is free, under the action of the spring 18, to

30

stop the bolt 21 in unlocked position once the bolt has completed its back unlocking movement.

The controlled burst fire is interrupted, after three
5 shots have been fired, with the bolt 21 stopped in unlocking position (Fig. 3) determined by the engagement of its catch 20 with the associated trip tooth 19 of the bolt stopping element.

10 At this time, as soon as the shooter stops holding the finger depressed on the trigger 1, the trip tooth 27 does not engage any longer the ratchet wheel 3 which returns, under the action of the torsion spring 33 in its rest position determined (Fig 3) by the abut-
15 ment of its lug 30 against the pin 34.

In this manner the firearm^{is}/prearranged for controlled burst fire of three further shots as soon as the shot depresses again the trigger 1.

20

The whole system reaches therefore the purpose of providing a trip mechanism which allows to fire, with the same firearm, both a single shot and a controlled burst with extreme easiness and safety of use.

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The invention can be carried out in other specific embodiments, differing from that which has been described, without departing from the spirit and the essential technical features of the invention.

30

In particular, all those similar trip mechanisms fall

within the scope of the present invention which are capable of controlled burst firing more or less three shots inasmuch as it is sufficient to increase or decrease the number of the trip teeth of the ratchet wheel 3. The provision in similar mechanisms of the continuous burst fire falls it too within the scope of the invention inasmuch as it is sufficient to increase the positions of the burst selector which is controllable from outside and consists of the extension 7 of the pivot on which the trigger 1 is pivoted, and to provide two different flat faces on the pin 5 instead of the single flat face 6, thus varying the extension of the trip 12 of the arm 9 from the trigger 1 according to the requirements of the single shot, controlled burst and continuous burst.

In general, while but one embodiment of the invention has been described and illustrated, it is obvious that a number of changes and modifications can be made without departing from the scope of the invention.

Claims

1. Trip mechanism with a controlled burst fire device characterized in that it comprises a ratchet wheel pivoted to the receiver of the firearm biased by a spring to a rest position against a limit stop, said ratchet
5 wheel having a plurality of trip teeth corresponding to the number of shots to be fired by a single burst, adapted to engage a trip tooth carried by the trigger and a plurality of lugs, equal in number to the trip teeth, adapted to engage an arm pivoted to the bolt
10 and biased by a spring towards a stop carried by the bolt; a bolt stopping element pivoted on the receiver of the firearm, biased by a spring and having a first trip tooth adapted to cooperate with a catch disposed on the bolt and a second trip tooth; and a rocking
15 arm pivoted on the trigger, constantly biased by a spring with one end thereof towards the pin on which the trigger is pivoted and having at the other end thereof a trip tooth adapted to cooperate with the second trip tooth of the bolt stopping element.

20

2. Trip mechanism as claimed in claim 1 characterized in that the pin on which the trigger is pivoted has a section of its side surface cut according to a plane parallel to the axis of the pin so as to provide a
25 flat face and is connected to a control member adapted to move it from a position in which said pin abuts the rocking arm by means of its cylindrical side surface to a position in which said pin abuts said arm by means of its flat side face and viceversa, by operating as a fire

selector for rearranging the arm either for the burst
fire or the single shot fire.

FIG. 1

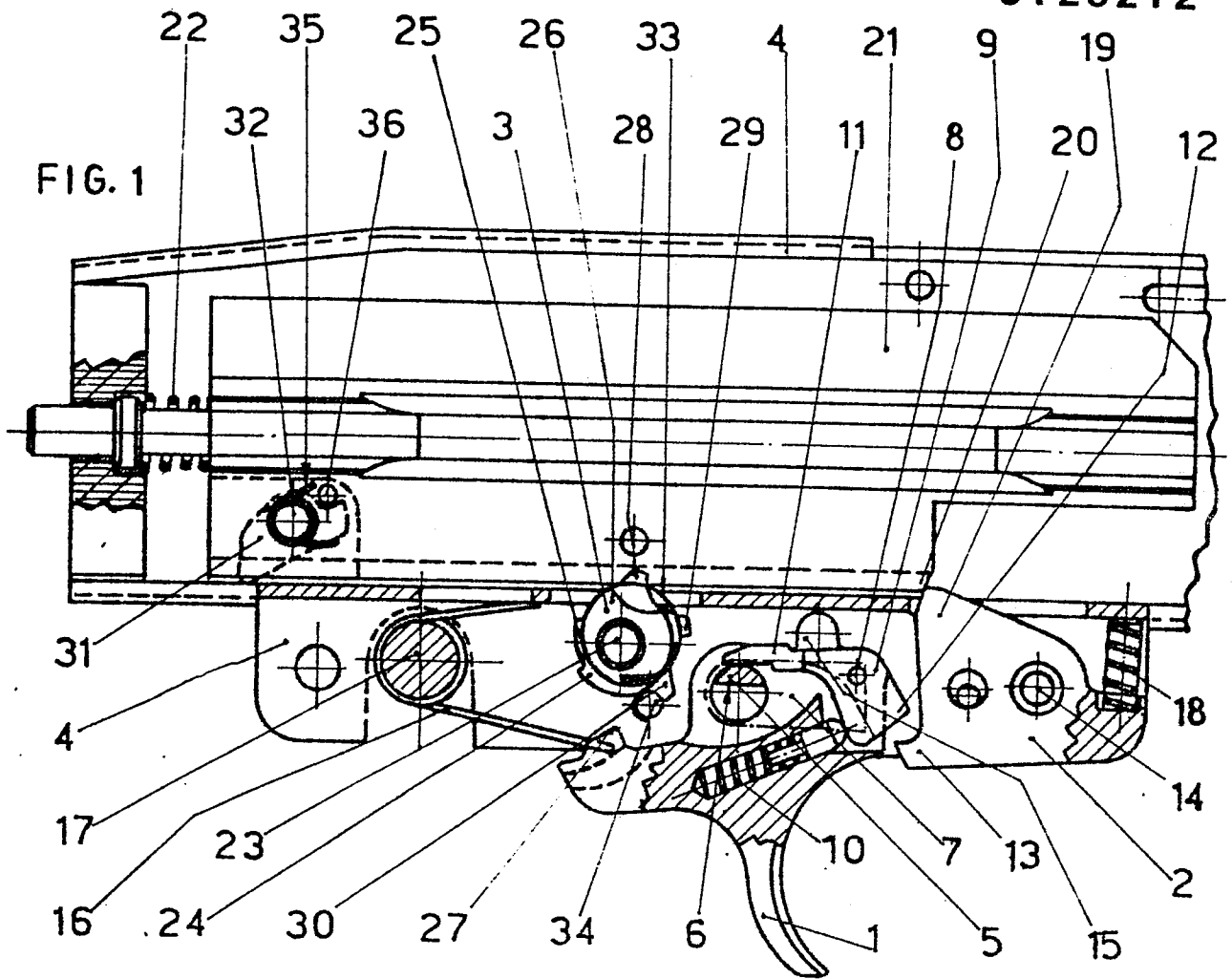


FIG. 2

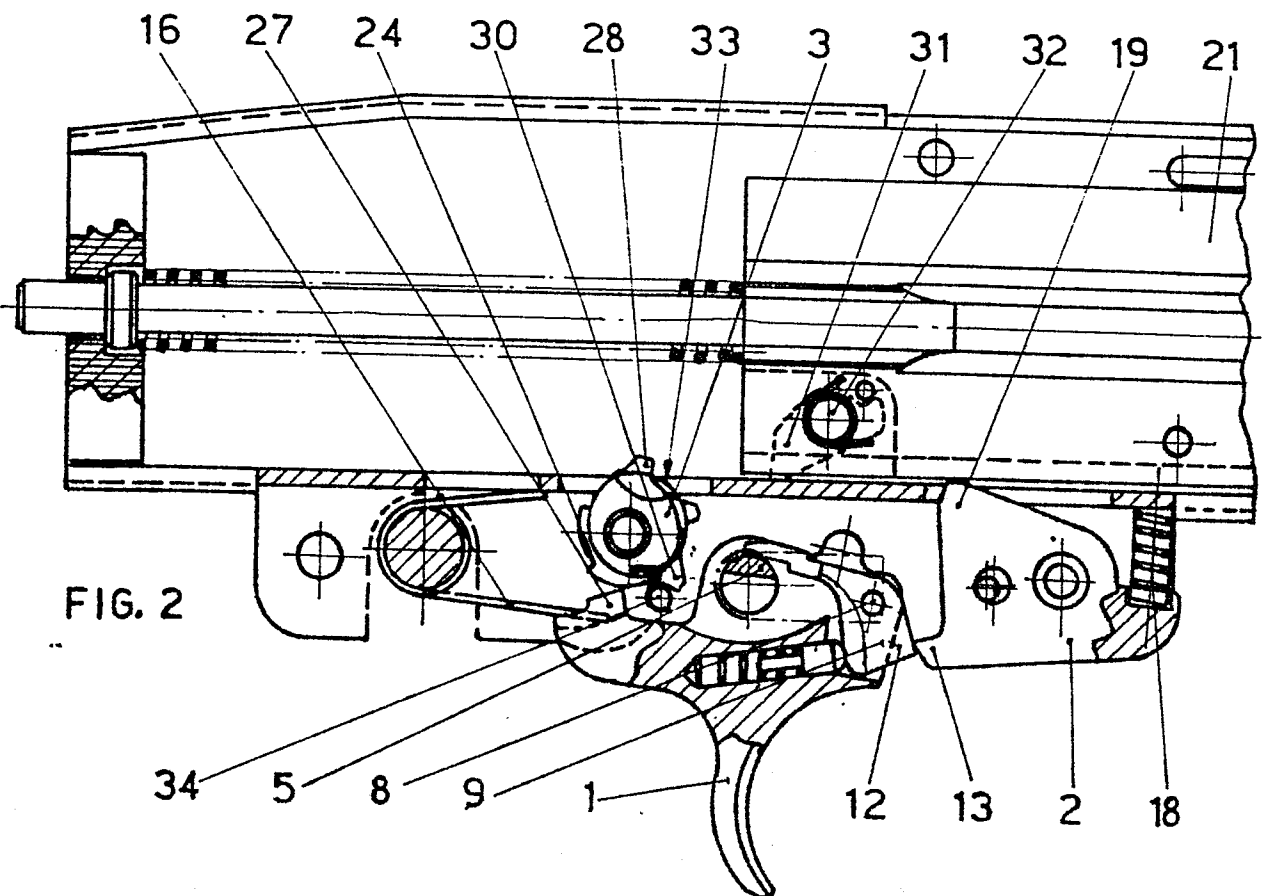


FIG. 3

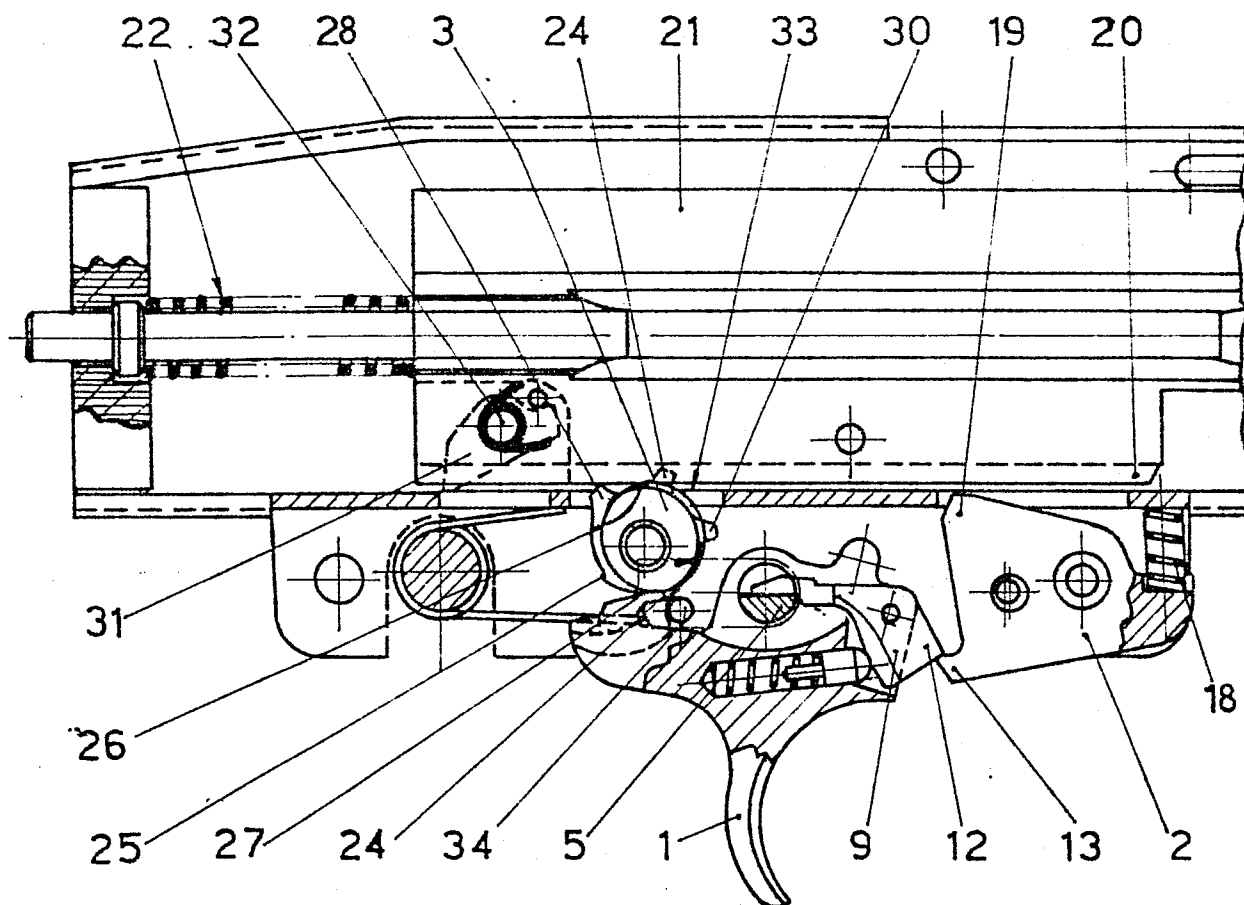
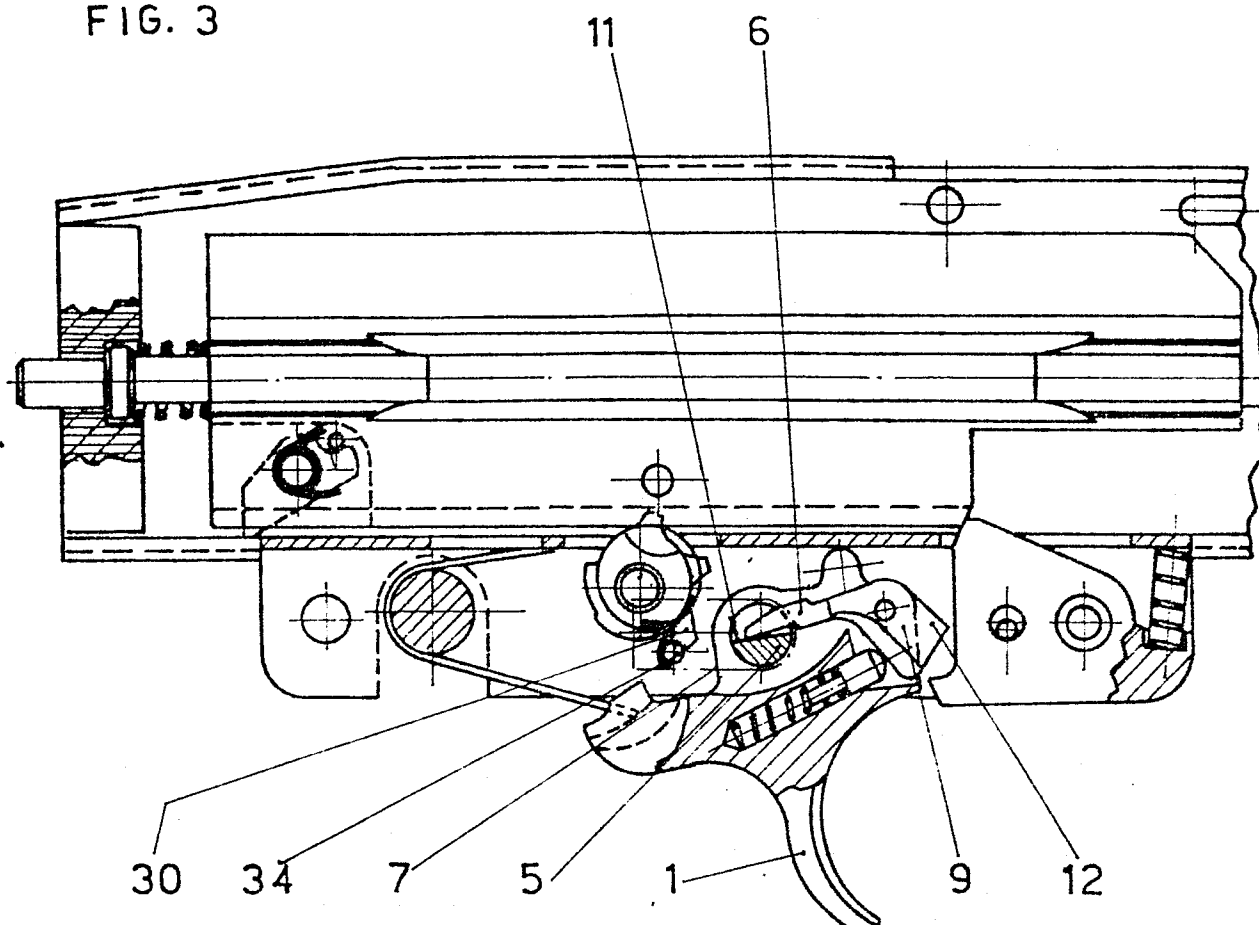


FIG. 4